Headquarters U.S. Air Force

Integrity - Service - Excellence

HAF GIO Introductory Brief

USAF GeoBase Data Architecture Workshop

28-30 Nov 2005

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Introductory Brief

- HAF GIO overview
- Recent HAF GIO activities
- GeoBase conceptual overview
- USAF GeoBase Strategic Plan
  - Review of relevant items
- USAF GeoBase CONOPS
  - Review of relevant items
- Summary

The HAF Geo Integration Office

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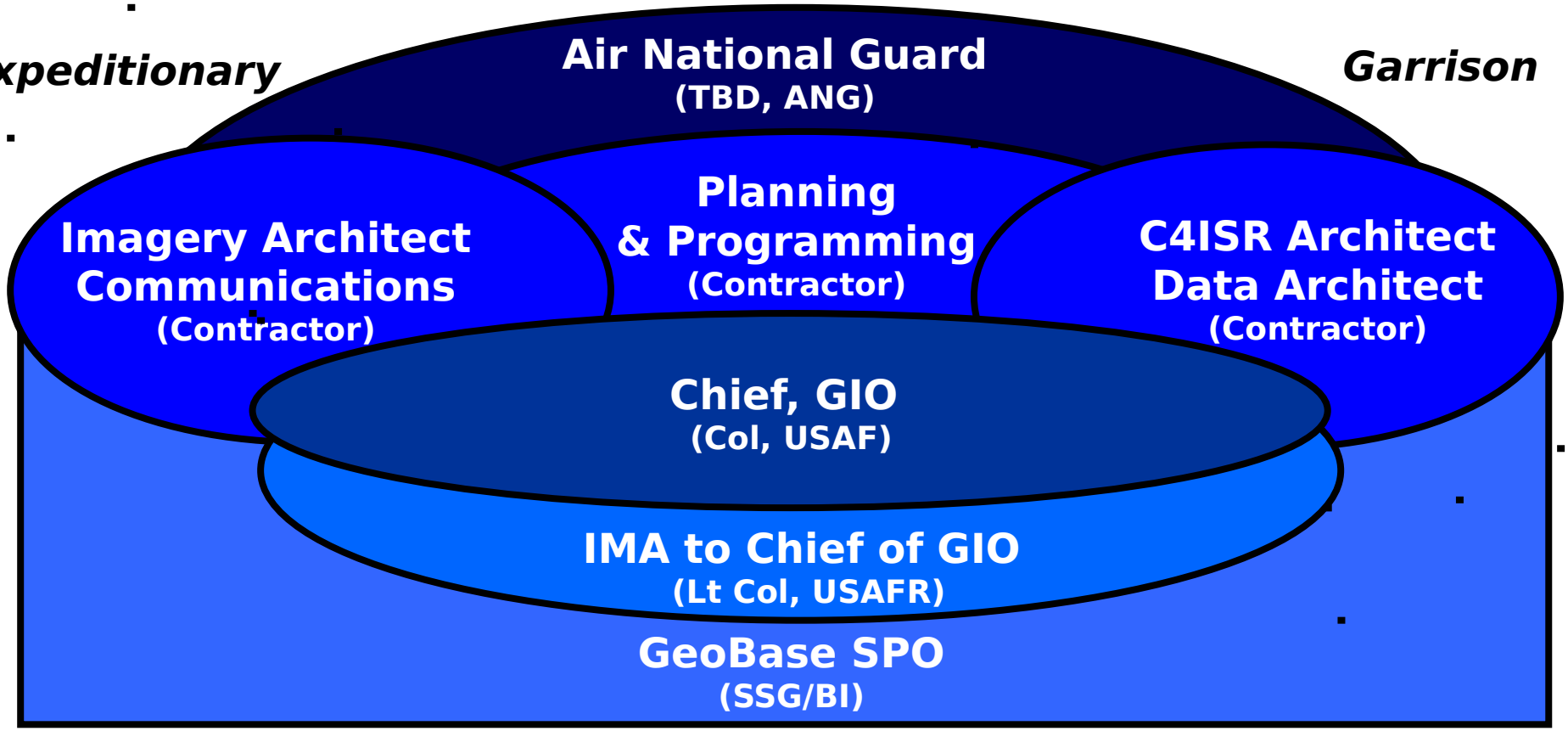

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HAF GIO Role and Responsibilities

- **Serve as Air Staff focal point for GeoBase Program**
  - **GeoBase Program advocate to AF Corporate Structure**
  - **Seek strategic GeoBase partners in USAF, DOD, USG, NATO**
  - **Publish Relevant Geospatial Information & Services Guidance**
- **Minimize GeoBase O&M Cost for MAJCOMs**
  - **Coordinate GeoBase application development**
  - **Pursue GeoBase economies of scale whenever possible**
  - **Share templates, experiences, best practices, best tools**
- **Institutionalize the USAF GeoBase**
  - **Build "one architecture that fits all" through a GeoBase SPO**
  - **GeoBase-enable the Air Force infostructure**
  - **Build sustaining GeoBase education and training agenda**

GeoBase Compass Strategy

- Compass Serves as Powerful Guiding Metaphor
- Technology and Sustainment 'Tracks' are Interwoven
- HAF GIO Operations are Oriented Along These 'Tracks'

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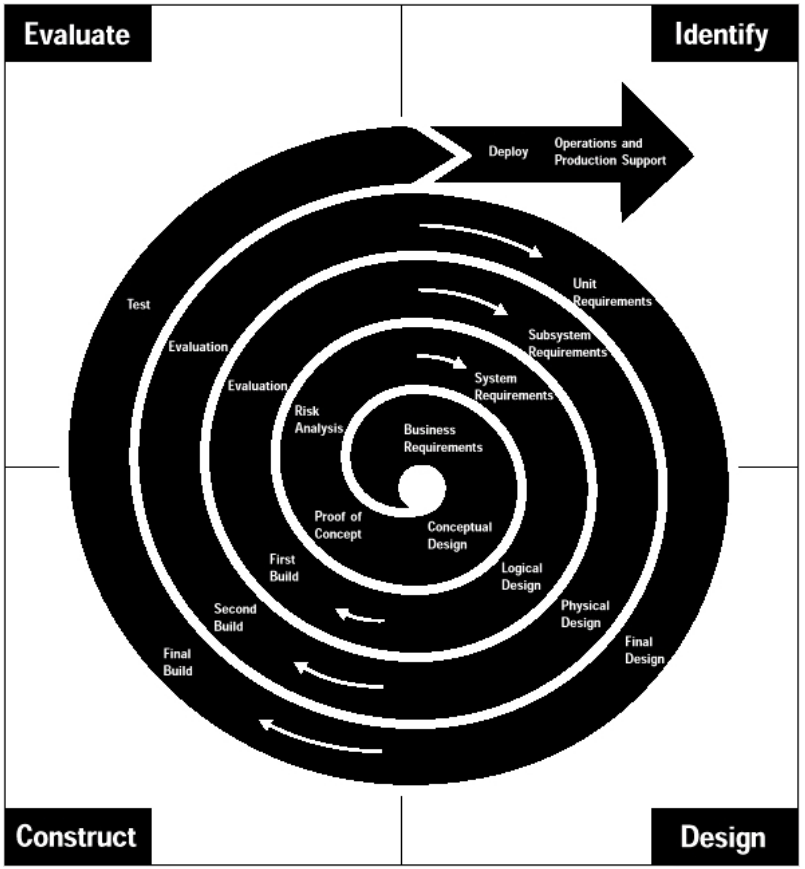
GeoBase Requirements

- Policy Directives
  - DoD
  - USAF
- Initial Operating Capability (IOC)
  - Garrison GeoBase
  - GeoReach
- Mid-Term Requirements
- Long-Term Requirements



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GeoBase Standards

- Spatial data standards
- Federal metadata standards
- NIMA data formats
- DoD communication protocols
- Information assurance (security) standards
- ***Not** technical s*

CADD/GIS TECHNOLOGY CENTER
for facilities, infrastructure, and environment

NIMA

FGDC
Federal Geographic Data Committee

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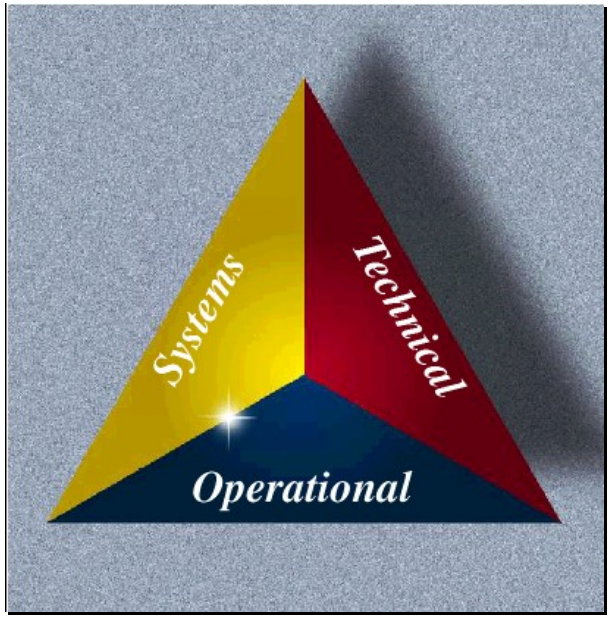
GeoBase Architectures

- Joint Technical Architecture – Air Force
- DII – COE
- JMTK Interoperability
- Software architecture (COTS)
- C4ISR Architecture Guidance
  - Operational architecture
  - System architecture
  - Technical architecture
  - GeoBase C4ISP:
    - OPR: HAF GIO
    - ECD: Aug 02



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Guidance C4ISR Architecture Framework

Items in red are directly related to the data architecture:

Product	Product Title	CRD	ORD	C4ISP
AV-1	Overview and Summary Information			✓
AV-2	Integrated Dictionary			✓
OV-1	High-Level Operational Concept Graphic	✓	✓	✓
OV-2	Operational Node Connectivity Description			✓
OV-3	Operational Information Exchange Matrix	✓	✓	✓
OV-5	Activity Model			✓
OV-6b	Operational State Transition Description			optional
OV-6c	Operational Event/Trace Description			✓
OV-7	Logical Data Model			✓
SV-1	System Interface Description		✓	✓
SV-2	System Communication Description			✓
SV-6	System Information Exchange Matrix			✓
SV-8	System Evolution Description			highly desirable
SV-10c	System Event/Trace Description			highly desirable
TV-1	Technical Architecture Profile			✓

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AFI 33-124, Enterprise Information Technology Architectures

- **Directs AF architecture development in compliance with C4ISR Arch Framework**
  - **Adds Activity Model (OV-5) and Logical Data Model (OV-7) as mandatory products**
- **More info on C4ISP architectures…**

The GeoBase Planning Process

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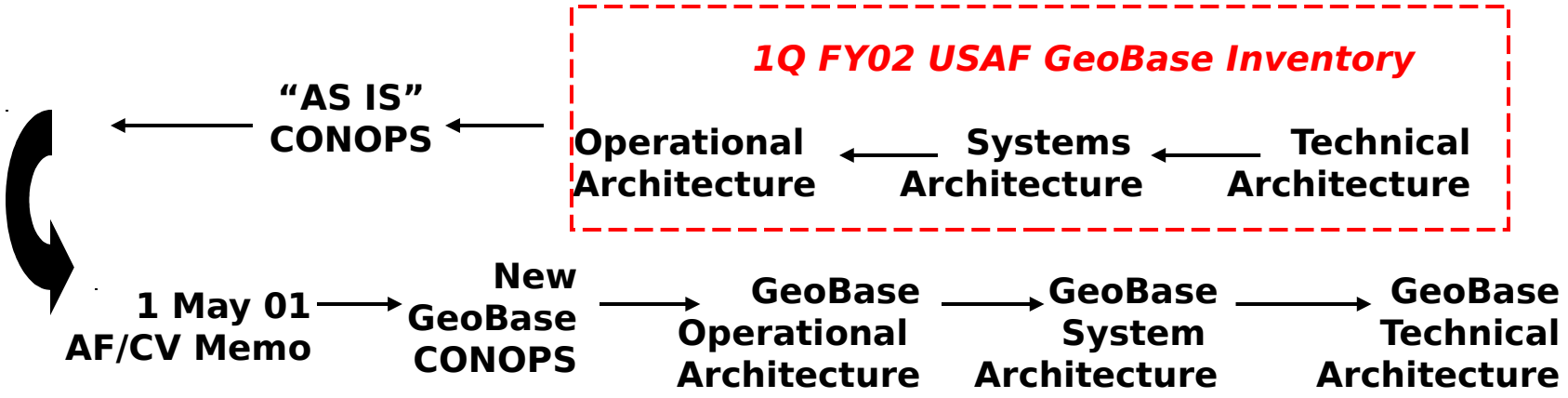
Traditional System Development

Operational Requirements Document → CONOPS → Operational Architecture → Systems Architecture → Technical Architecture

GeoBase IRM System Development



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Recent HAF GIO Activities

- Support Operation Enduring Freedom
  - GeoReach implementation
  - GeoReach coordination
- GeoBase inventory
- GeoBase programming
- Developed USAF GeoBase Strategic Plan
- Developed USAF GeoBase CONOPS
- Exploring GeoBase SPO @ SSG
- Integration efforts
  - ACES-RP, ACES-EM, Command Core, etc.

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GeoReach OEF Support

- Provided new web-enabled basing visualization tools for CINC and AF CAT situational awareness
- Used since 9/11 for "Go/No-Go" basing decisions
- GeoReach library of FOL common installation pictures
- Ground breaking synergy between CE, IN, LG, SF
- RED HORSE, CRS, PRIME BEEF acquiring/relaying base intelligence
- Allows tailoring of TPFDD forces and resources

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FY02 GeoBase Inventory

- Baseline AF GeoBase Investments
- Goal: Quality Data with Minimal Mission Impact
  - Phase I – HAF GIO/MAJCOM POCs
    - Major garrison trends inventoried NLT 15 Dec 01
  - Phase II – HAF GIO/MAJCOM GIOs
    - Detailed expeditionary trends inventoried NLT Jan 02
    - Detailed garrison trends inventoried NLT Mar 02
- Inventory will shape key events
  - FY02 WRAP Funding
  - FY02 Supplemental Allocation
  - GeoBase Target Architecture

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Programming Strategy

- **Draft APPG**
  - **Acquire GeoBase IOC for all active, Guard, and Reserve garrison and expeditionary installations as defined in the HAF GIO CONOPS**
    - **3 Tests: Practical, Effective, Enduring**
    - **Satisfy the C2 Queries: “What is it, Where is it, What’s around it”**
  - **Capability must extend to organizations with an AEF base support planning requirement**
- **Program Element Code 0301025F, GeoBase**

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Programming Strategy

- **Involves both centralized and decentralized approach**
- **HAF GIO will buy-down MAJCOM GeoBase costs**
  - **Provide bridge funding for MAJCOM GIO thru FY04**
  - **Fund GeoBase SPO to guide architecture development**
  - **Acquire 1-m imagery on regular basis**
  - **Secure necessary GPS resources**
- **MAJCOMs will POM for balance of GeoBase capability**
  - **Functional stewardship is core to GeoBase program**
  - **Wing Communications forum will guide local GeoBase**

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What is GeoBase

Vision

One Base…One Network…One Map

Mission

Deliver a comprehensive, integrated capability for the Air Force to attain, maintain, and sustain one geospatial information infrastructure supporting 'Blue Force' basing requirements

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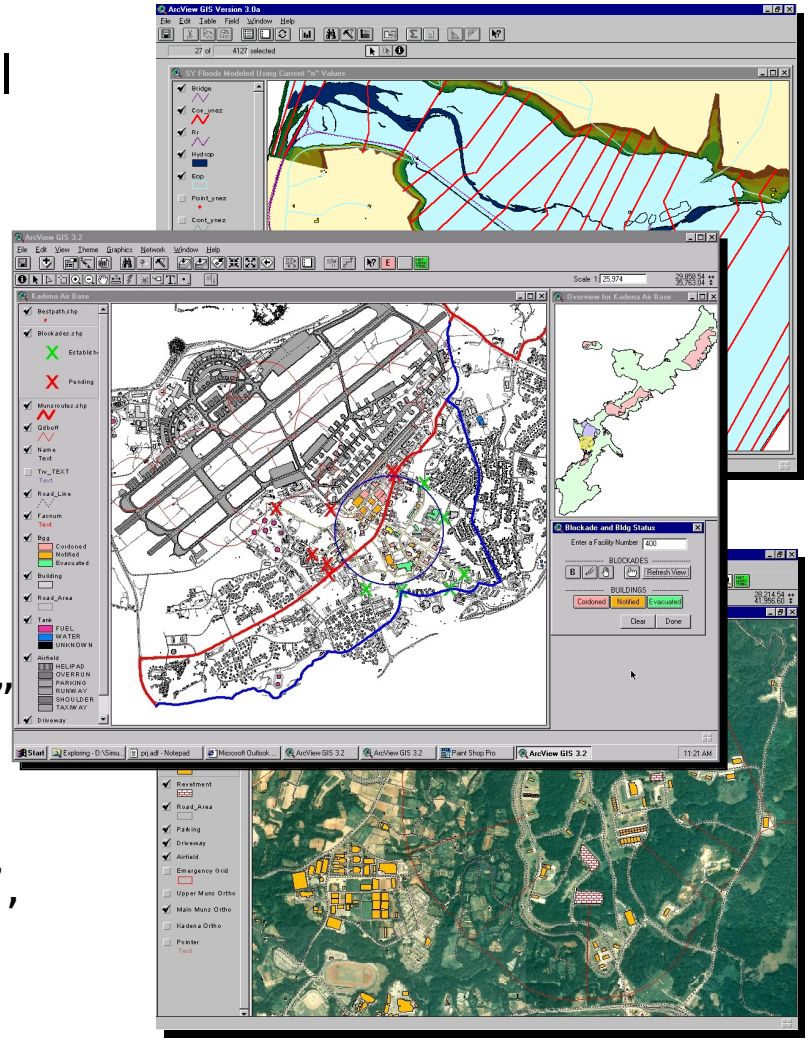
What is GeoBase?

- Commander's decision support tool
  - Elevates access & visibility to mission data
- Situational awareness
  - Crisis and routine situations, contingency planning
- Common Installation Picture (CIP)
  - One base – one map:
  - Improves base support planning
  - Integrated "mission decision space" for the commander
  - Raise decision confidence by answering "what is it", "where is it", and "what's around it"



What is GeoBase

- **Situational Awareness:**
  - ***Event: Chlorine spill / release***
    - **Identify traffic control points**
    - **Establish cordons**
    - **Evacuate buildings**
    - **Determine contaminant**
    - **Model contamination plume**
    - **Re-establish new cordons**
    - **Re-route munitions convoy**
  - ***Event: Aircraft crash in base vicinity***
    - **Joint service response**
    - **Coordination with local community**

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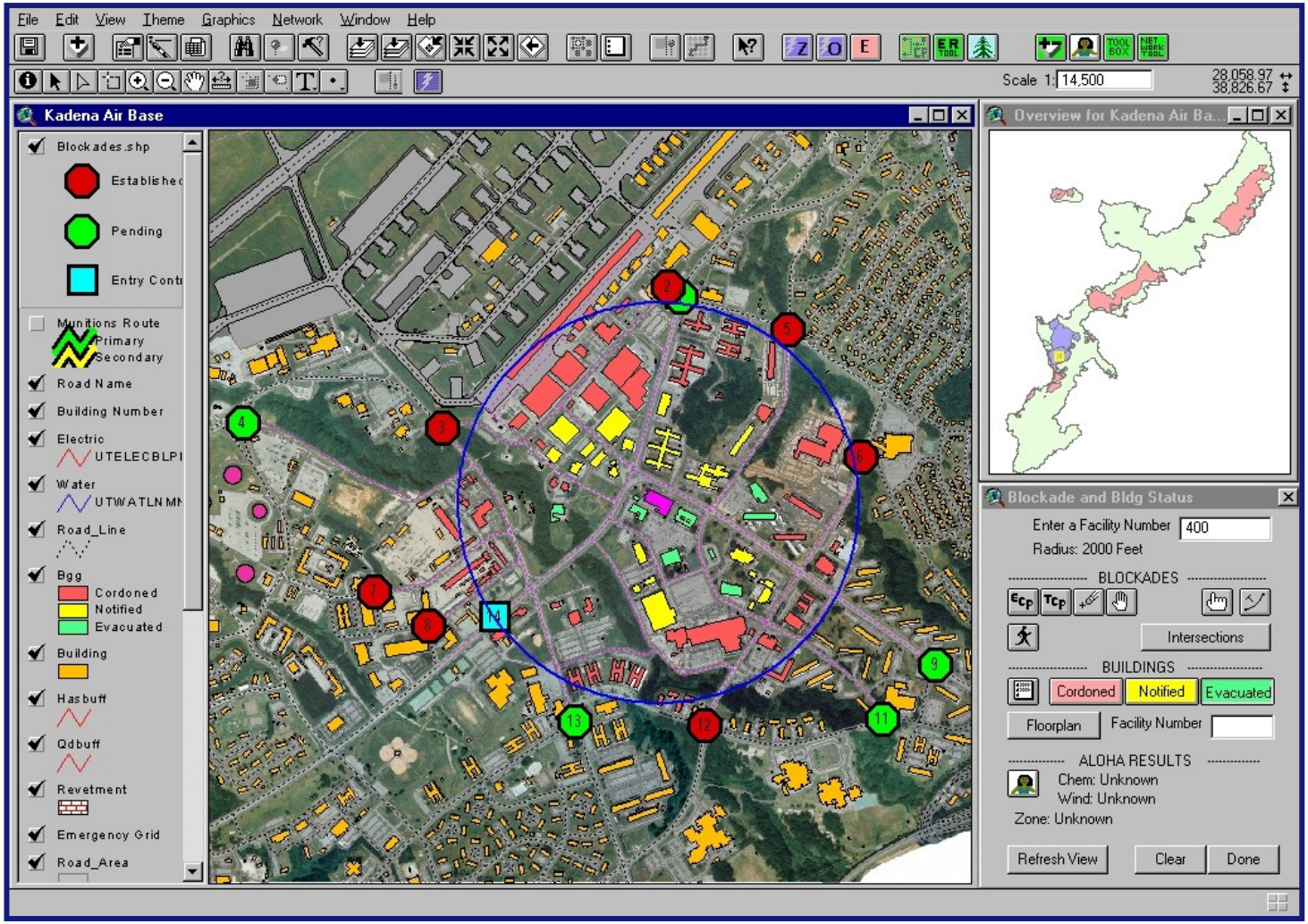
What is GeoBase



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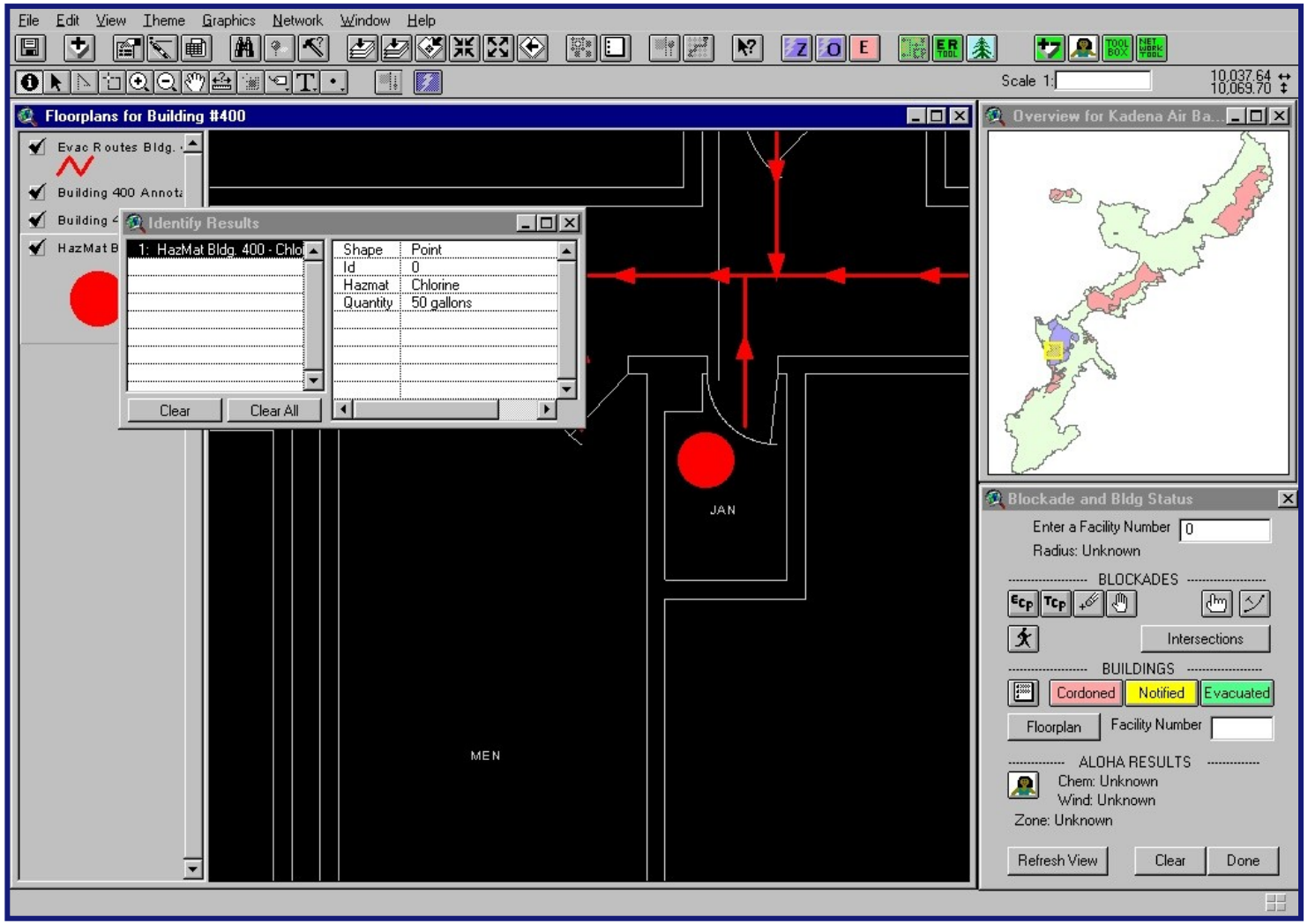
What is GeoBase



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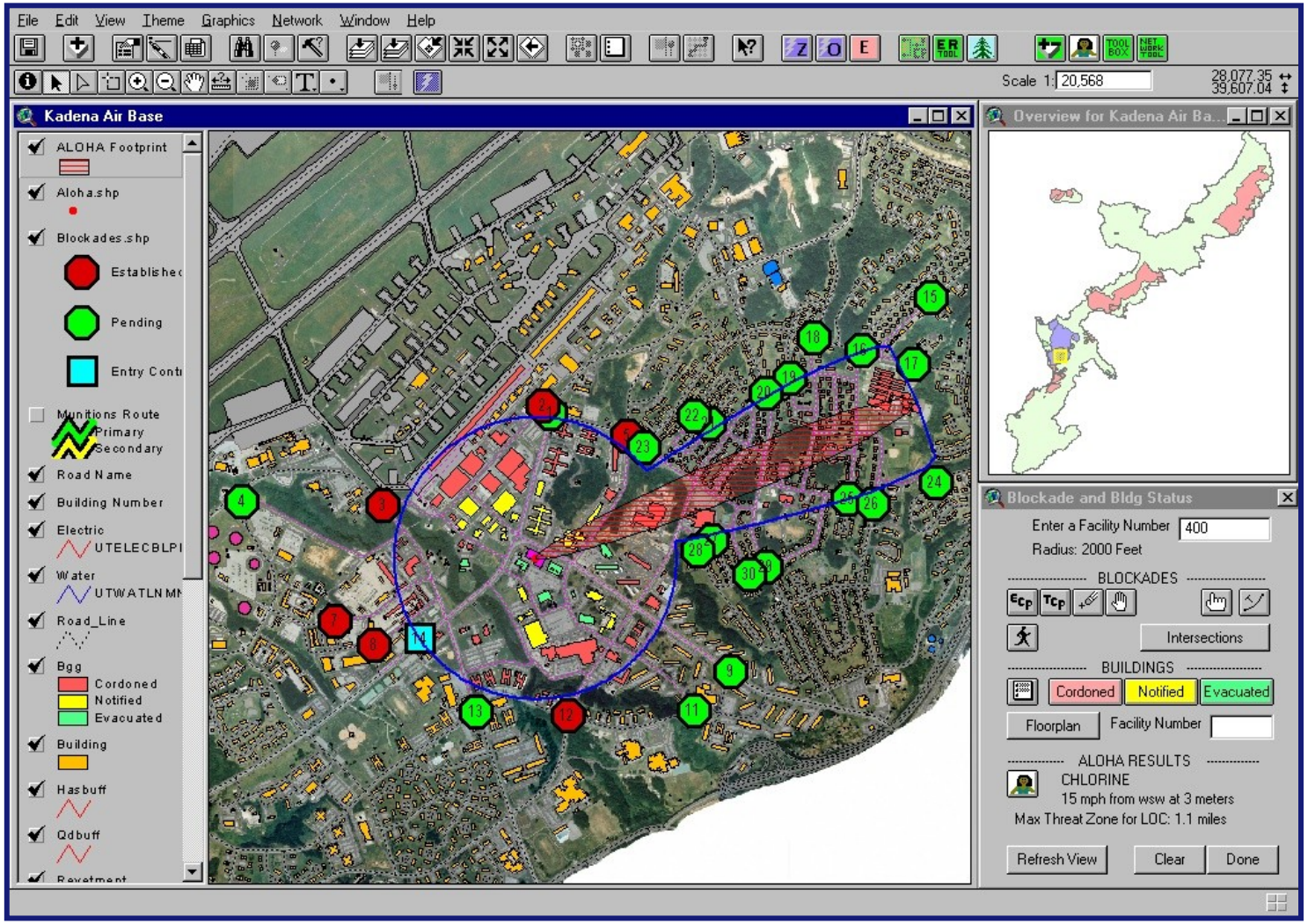
What is GeoBase



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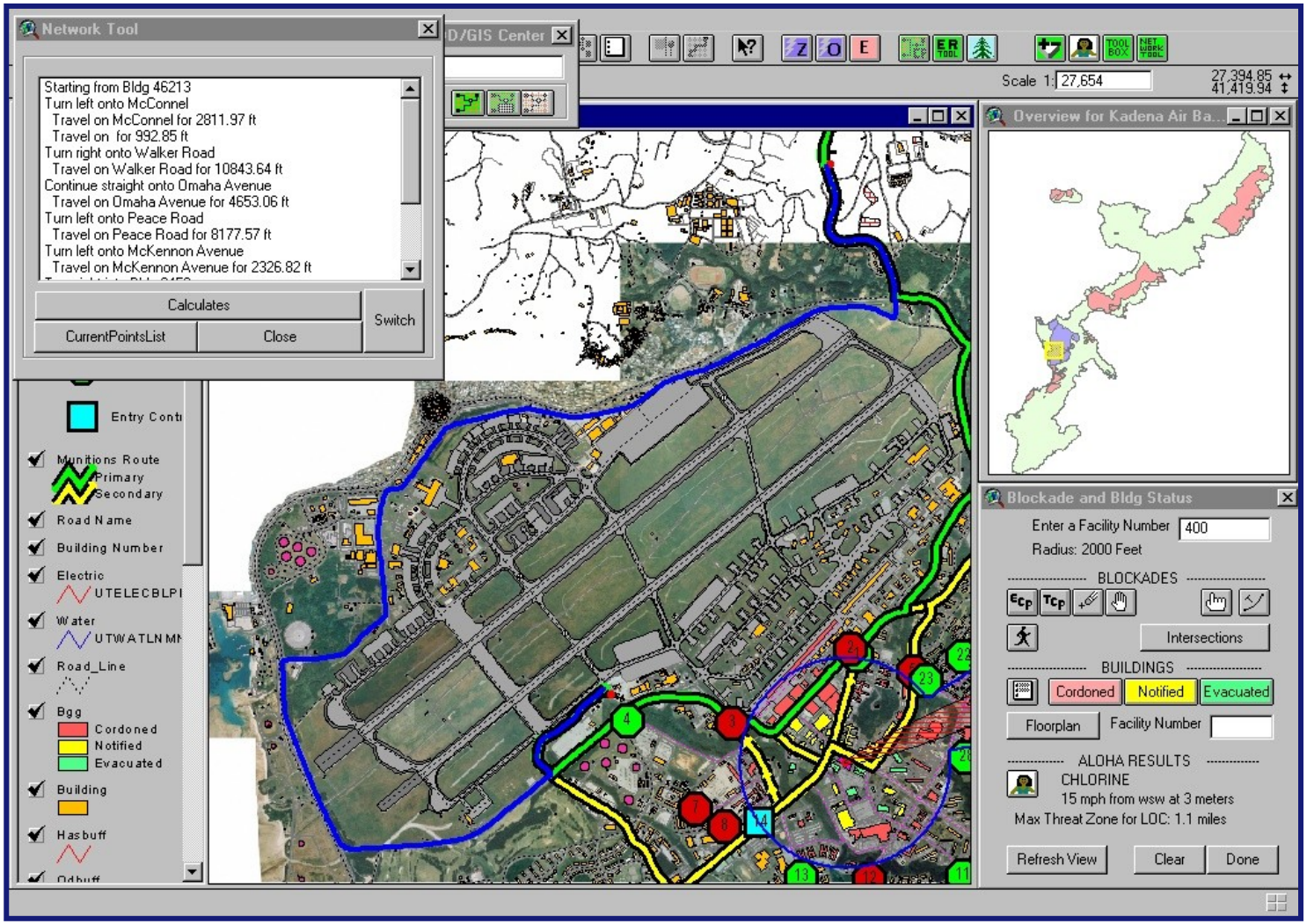
What is GeoBase



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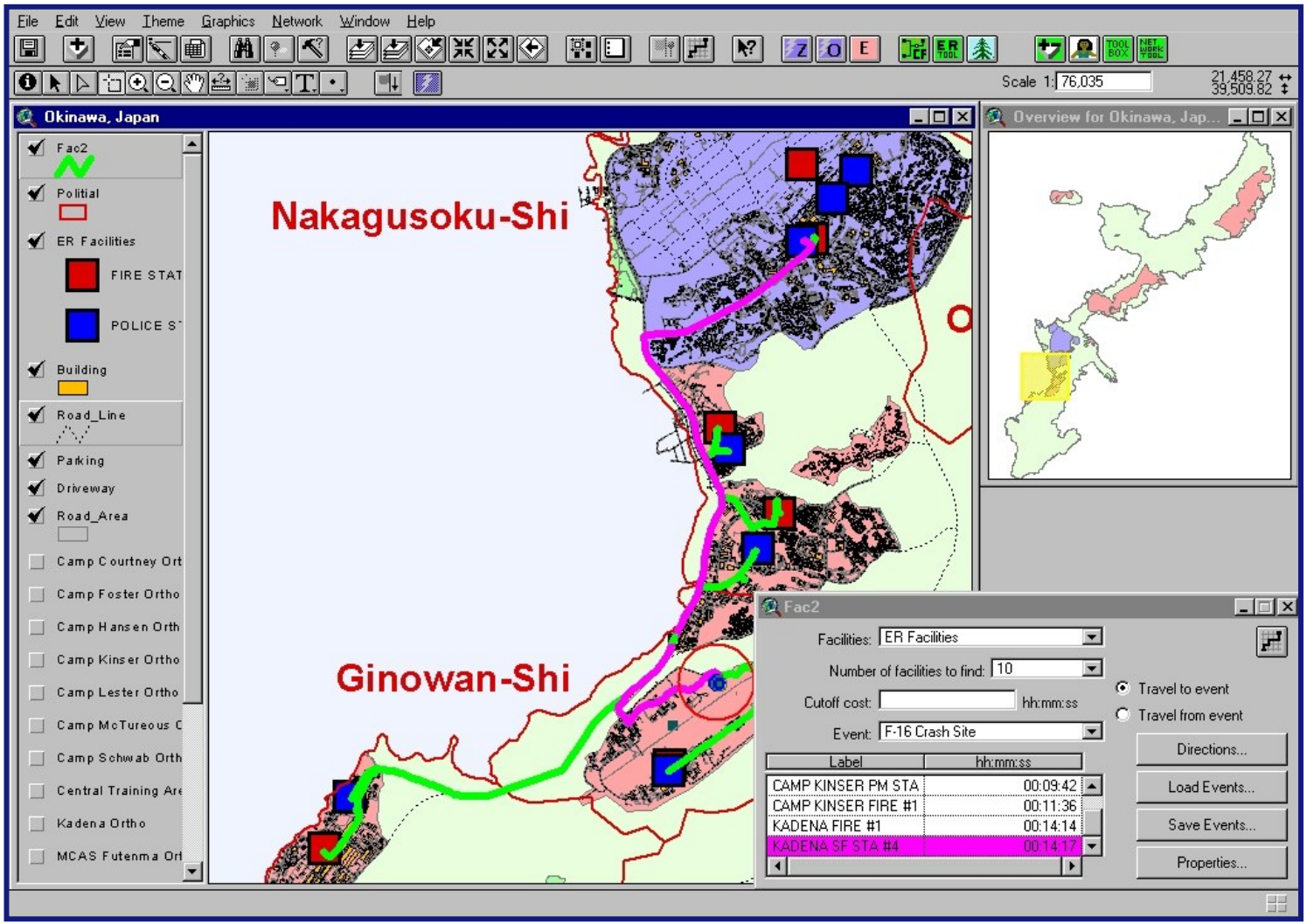
What is GeoBase



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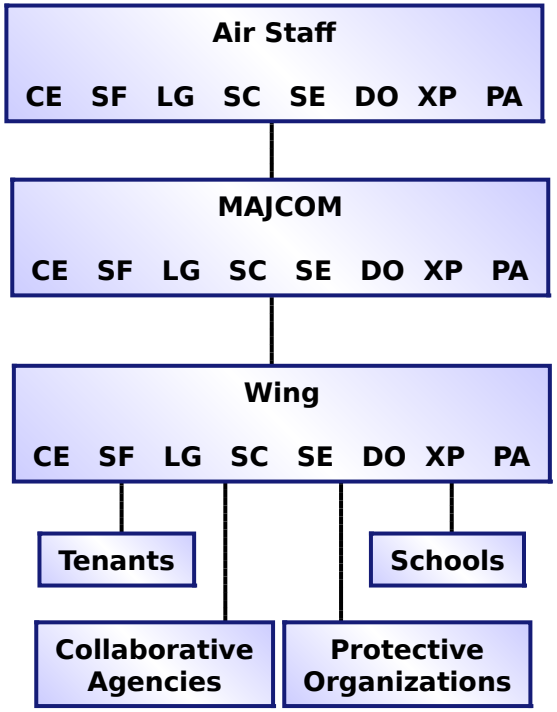
GeoBase Customers

- Air Staff
- MAJCOM (“GeoReach”)
  - Contingency Planning
  - Bare Base Planning
- Base (“GeoBase”)

Engineering	Communications
Fire	Operations
Police	Logistics
Environment	Munitions
Planning	Treaty Compliance
Public Affairs	Legal
Tenants	Schools
Collaborators	Protective Organizations



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Concept of Operations
The Integrated GeoBase

- Garrison GeoBase
- GeoReach
- Expeditionary GeoBase

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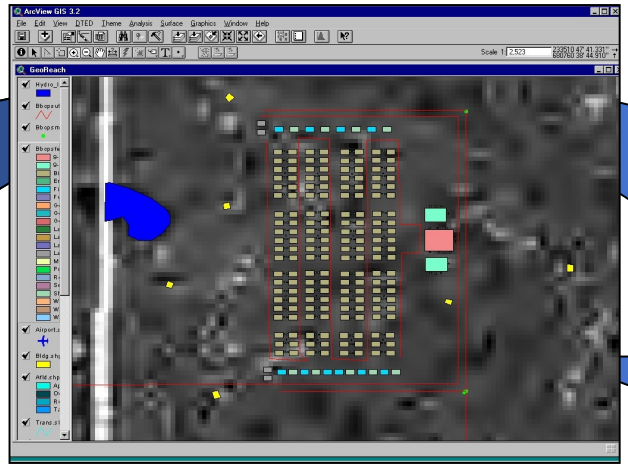
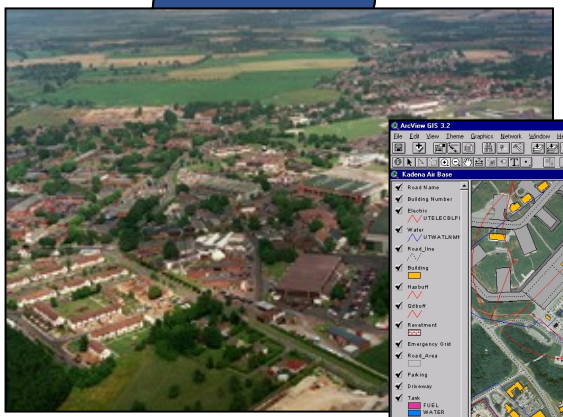
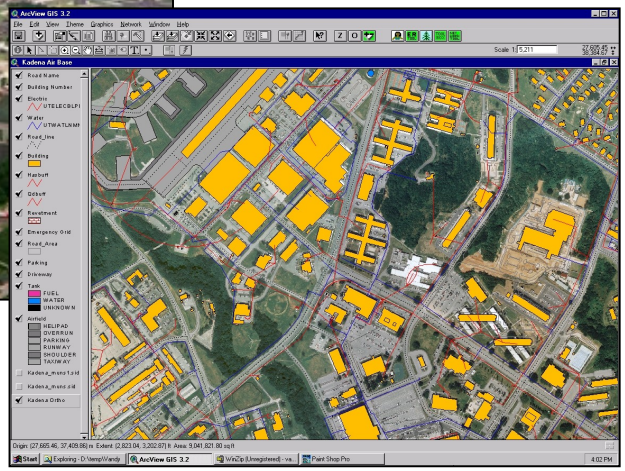
Concept of Operations
The Integrated GeoBase

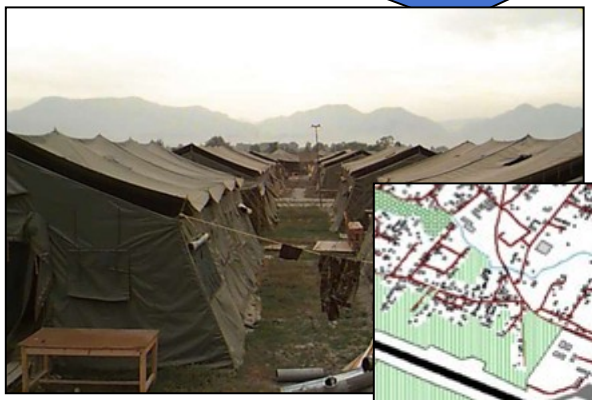


GeoReach





Garrison GeoBase



GeoBase deployed

Concept of Operations Organizational Structure

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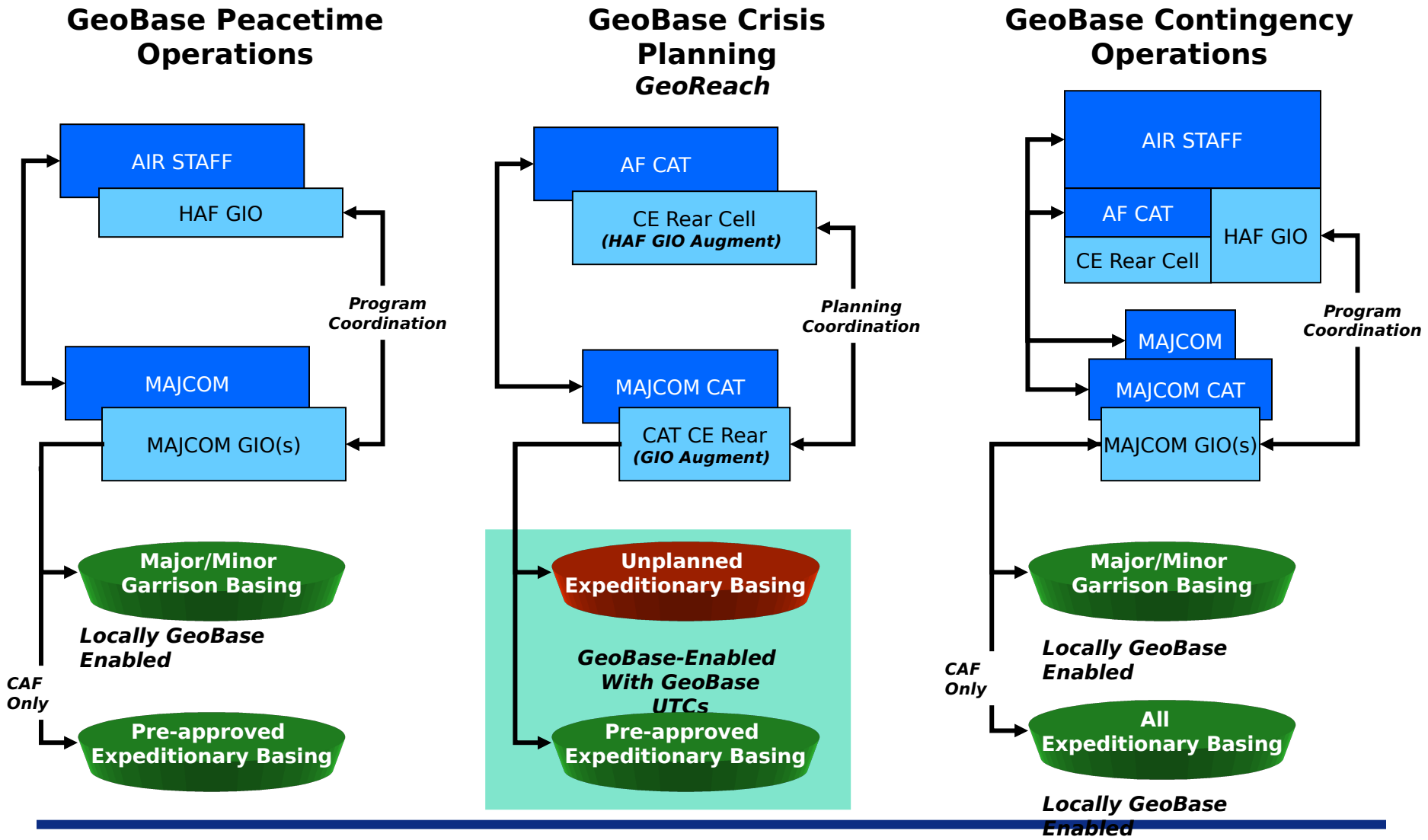

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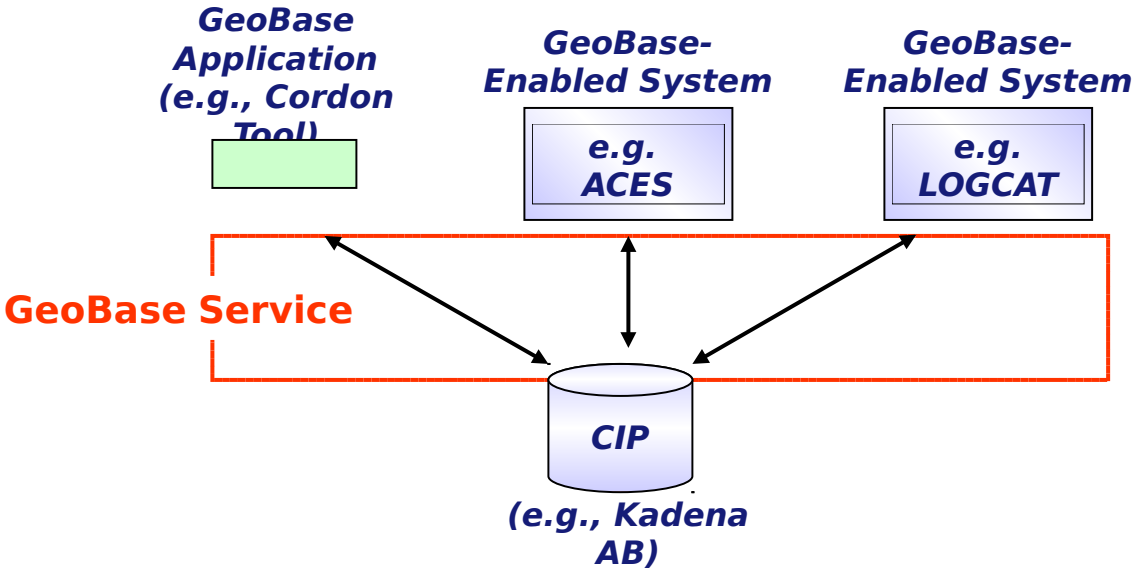
Concept of Operations GeoBase Elements

- The CIP
- The GeoBase Service
- GeoBase Applications
- GeoBase-Enabled Systems …



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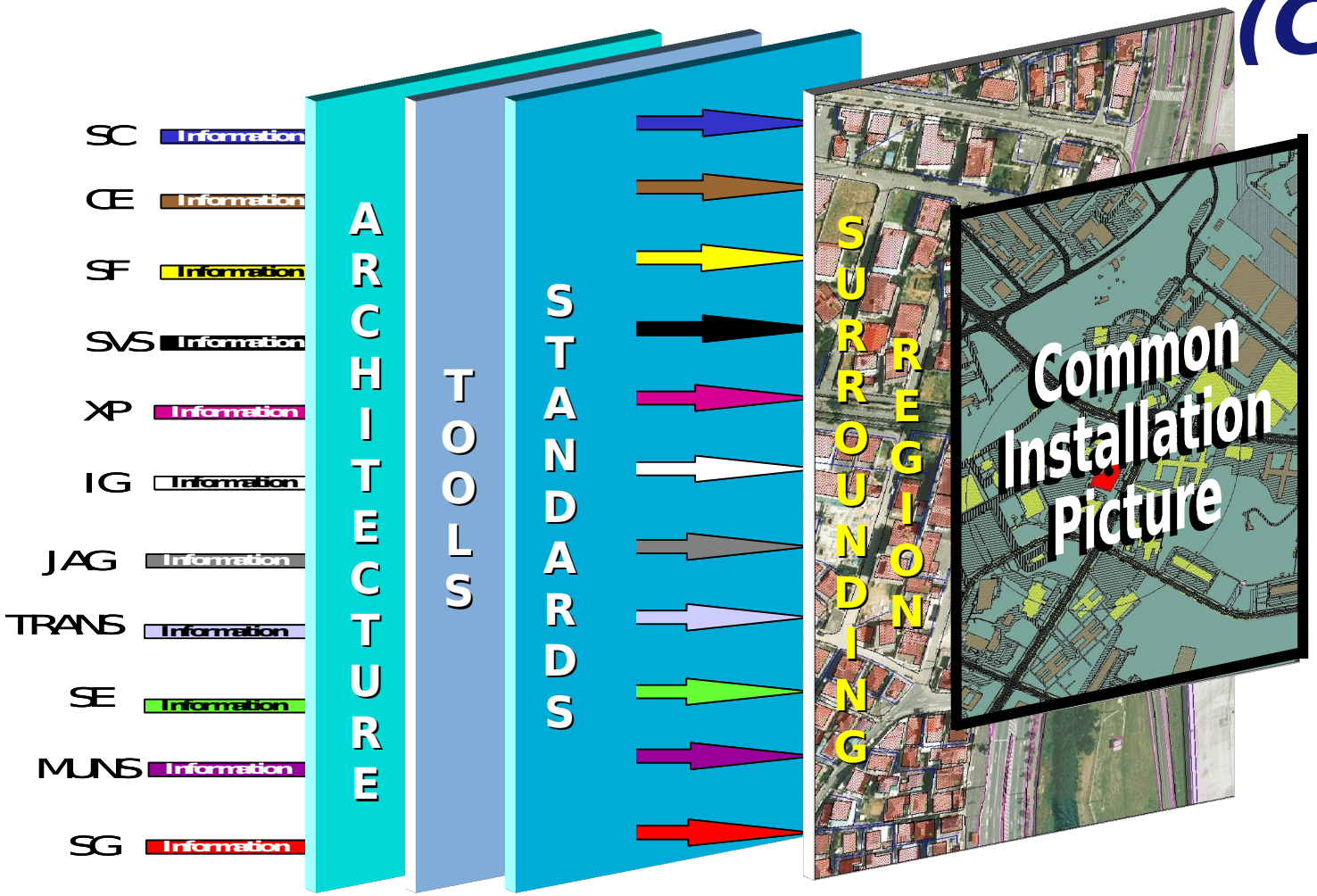
The Common Installation Picture (CIP)



The Common Installation Picture (CIP)

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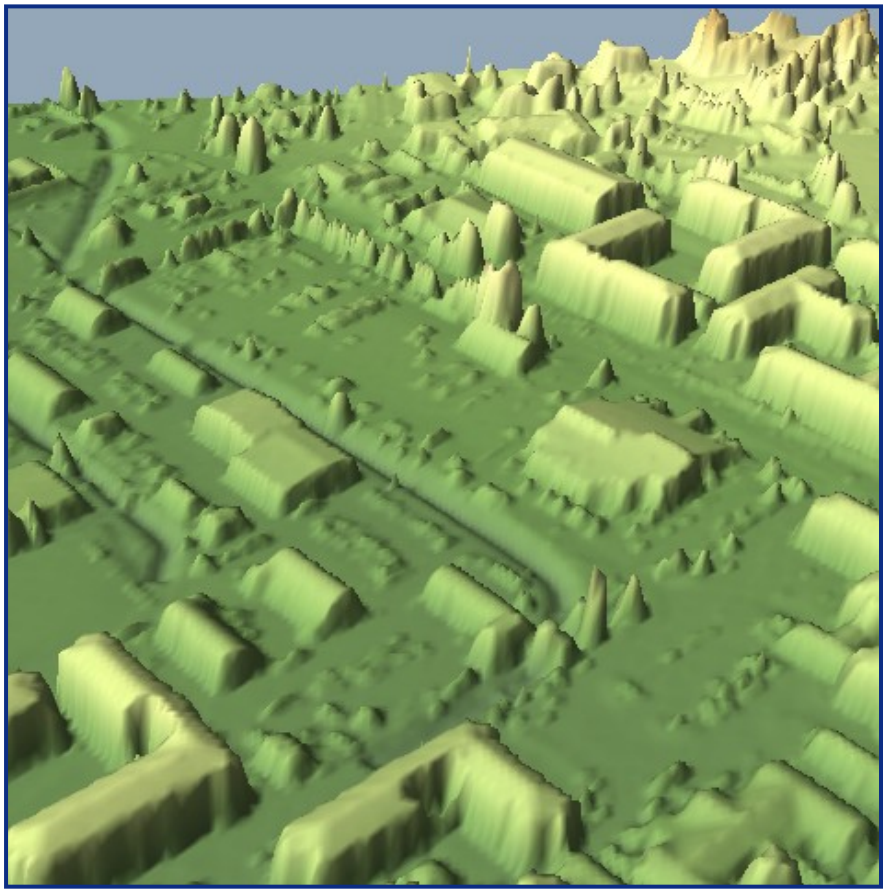
- **Contents**
  - **1m Imagery (NIMA)**
  - **Vector data**
    - **GeoReach**
    - **Garrison GeoBase**
    - **Extent of the CIP determined by base commander**
- **The Regional Installation Picture (RIP)**



Osan AB, Korea
DEM Courtesy of the Joint Precision Strike Demonstration Office

Concept of Operations GeoBase-Enabled Systems

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- **Formal discussions with over 15 systems including:**

Logisticians Contingency Analysis Toolkit (LOGCAT)
AF/ILXX

Installation Data Warehouse (IDW)
AF/IL

Next Generation Installations (NGI)
SAF/IEI

Base Information System (BIS)
OSD/I&E

Base Engineer Survey Tool (GeoBEST)
PACAF/CEXX

Contingency Aircraft Parking Planner (CAPP)
AMC/DO

Command Core
OSD/I&E

Automated Civil Engineer System (ACES)
AF/ILE

Infrastructure Capacity Analysis Tool (IRCAT)
AF/ILEPB

Combat Support Command and Control (CSC2)
AF/XOF

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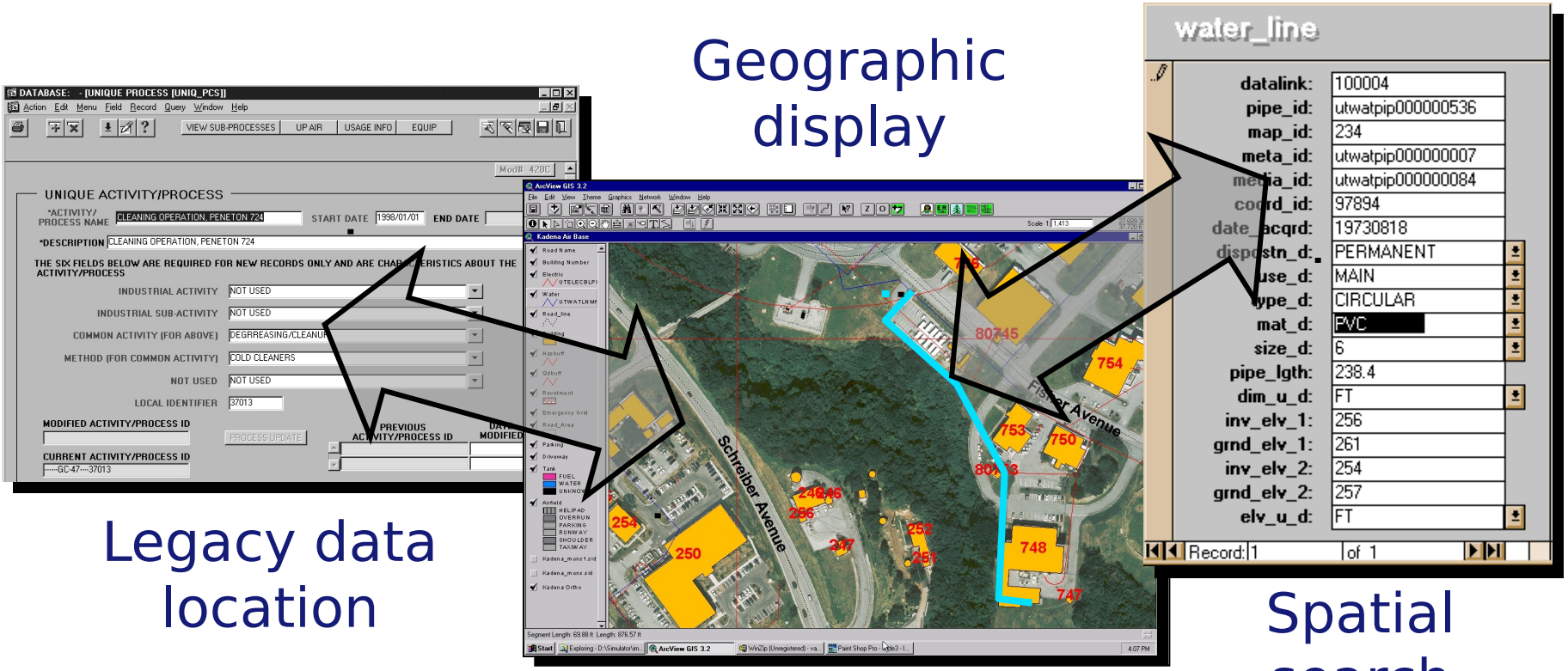
Concept of Operations
GeoBase-Enabled Systems

Geographic display



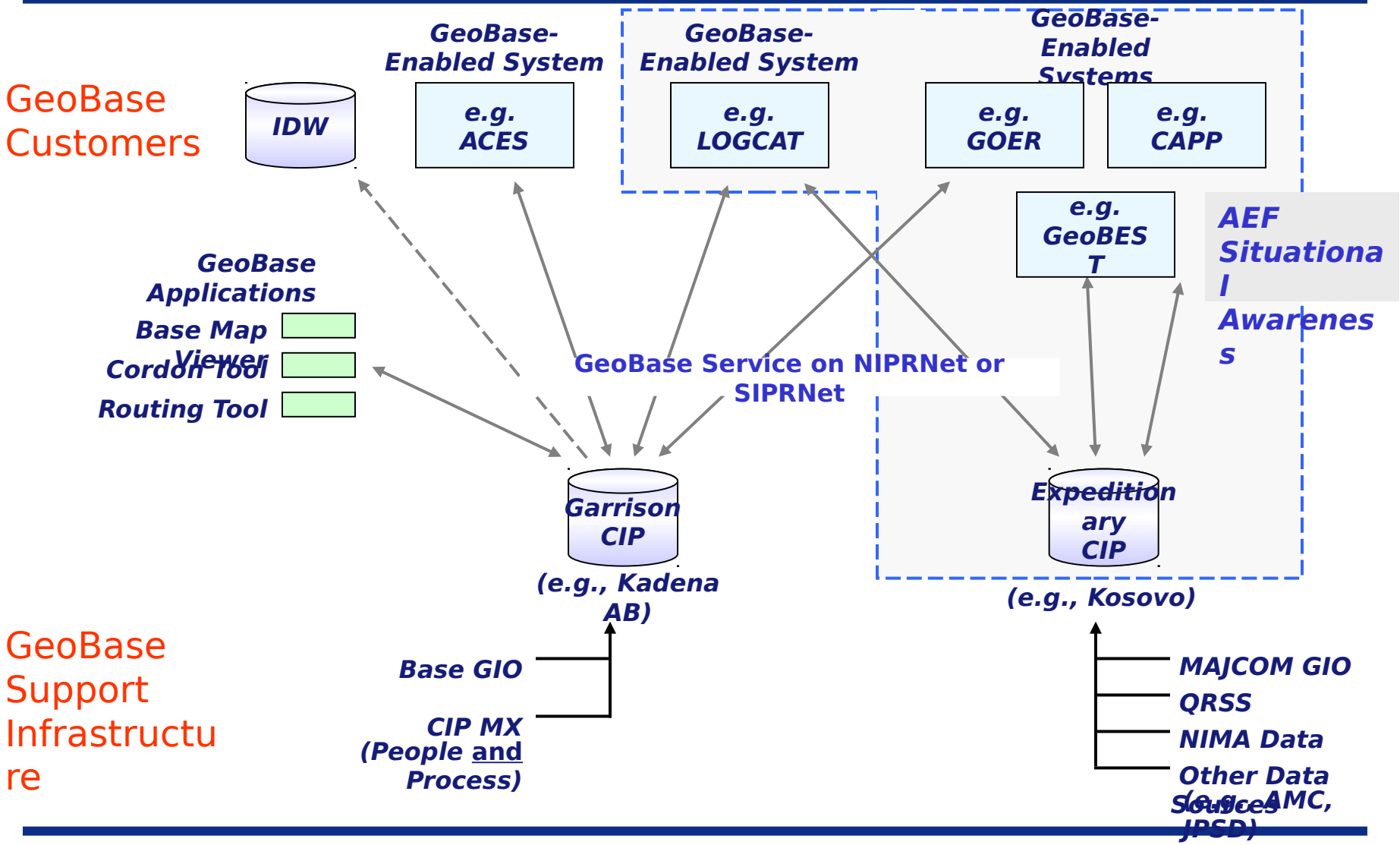
Legacy data location

Spatial search

Georeference mission data *to* the CIP

Locate mission data *from* the CIP

Concept of Operations
GeoBase Operational View



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USAF GeoBase Strategic Plan: Goals and Objectives

Goal 1: Develop Core GeoBase Capabilities

- Establish a Baseline Assessment of Existing GeoBase Investments
- Establish a Common Definition and Understanding of GeoBase
- Establish Operational Architecture Based on GeoBase Functional Requirements
- Define and Document GeoBase System Architecture
- Define and Document GeoBase Technical Architecture
- Establish a GeoBase Imagery Architecture
- Develop a Standards-Based GeoBase Data Architecture
- Create an Application Framework to Access GeoBase Services...

USAF GeoBase Strategic Plan: Goals and Objectives

Goal 2: Enhance Mission Capabilities through Integration with GeoBase

- Establish a Detailed View of the GeoBase System Interfaces
- Consolidate Mapping Processes Through GeoBase Services
- Enhance Key Mission Systems Through GeoBase Services
- Identify Opportunities to Improve Air Force Mission Processes...

USAF GeoBase Strategic Plan: Goals and Objectives

Goal 3: Execute and Sustain the GeoBase Program

- Develop Strategic and Implementation Planning Guidance
- Establish a GeoBase Education and Training Plan
- Promote the GeoBase Program
- Partner with Other Organizations for Mutual Benefit
- Establish Policy and Guidance
- Establish a Viable Program Management Process
- Establish a Sound Programming Strategy.

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USAF GeoBase Strategic Plan: Data Tasks

Objective 1.6 - Establish the GeoBase CIP

- **Task 1.6.1 – Define a Minimum Set of GeoBase Imagery Requirements**
- **Task 1.6.2 – Define the USAF GeoBase Common Installation Picture (CIP) and Data Suppliers**
- **Task 1.6.3 - Provide Guidance as to Building and Maintaining the CIP**
- **Task 1.6.4 – Program for HAF GIO acquiring 1-m commercial satellite imagery of USAF major, minor and expeditionary installations on a three-year interval.**

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USAF GeoBase Strategic Plan: Data Tasks

Objective 1.7 - Develop a Standards-Based GeoBase Data Architecture

- **Task 1.7.1 – Identify Existing Geospatial Data Standards used by Air Force Organizations**
- **Task 1.7.2 – Provide Guidance on Minimum and Recommended Data Standards**
- **Task 1.7.3 – Develop a Data Management Plan to Address Geospatial Data Capture, Conversion, and Management**
- **Task 1.7.4 – Establish Guidance on Development, Distribution, and Use of Spatial Metadata**
- **Task 1.7.5 – Institute Standard Quality Assurance and Quality Control (QA/QC) Procedures to Ensure Accurate and High Quality GeoBase Data**
- **Task 1.7.6 – Establish Standards-Based GeoBase Data Sharing Protocols**

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USAF GeoBase Strategic Plan: Data Tasks

Objective 2.1 - Establish a Detailed View of the GeoBase System Interfaces

- **Task 2.1.3 – Determine Level of Integration Necessary Between Air Force Basing Mission Systems and the GeoBase Service**

Objective 2.2 - Consolidate Mapping Processes through GeoBase Services

- **Task 2.2.1 – Establish Definitions and Recommend Storage Locations for Spatial and Non-Spatial (Attribute) Data**
- **Task 2.2.2 – Establish Procedures to Identify and Minimize Data Redundancy During CIP Development**

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IL IS Data Strategy

Vision

All data within bases and Logistics is an Enterprise asset. It will be accurate, timely, trusted, secure, and made available to all valid users

- **Data Capture**
  - **Data will be captured via automated information technology whenever possible**
  - **Data will be entered once and only once**
- **Data Structure**
  - **Data will be structured so that it is easily accessible to all authorized users and applications**
  - **Data will be retrieved from the authoritative/originating source**
  - **Data structure will be based on best value principles and technical performance requirements**

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IL IS Data Strategy

- **Data Management**
  - **HQ USAF/IL will exercise corporate wide data management**
  - **Standard data exchange protocols will be used**
  - **Authoritative sources and data stewards will be identified**
- **Data Location**
  - **Minimal transactional data to support daily business will be maintained in transactional databases**
  - **Current status and short-term historical data will be stored in Operational Data Stores**
  - **Long-term historical data will be stored in an Enterprise Data Warehouse**
  - **Metadata will be maintained corporately in a Metadata Repository**

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USAF GeoBase CONOPS: GeoBase IOC Capability

- Base map viewing capability (pan, zoom, display/hide CIP map layers) via web-enabled or desktop mapping software.
- Ad-hoc and “canned” (predefined) query capability to query map attributes and information from ACES-RP (Real Property module) via the map.
- Ad-hoc and “canned” reporting and printing.
- Ad-hoc and “canned” hard-copy map generation and printing.
- GeoBase applications providing geospatial analysis capabilities, implemented as “add-ons” (components) to the core base map viewing software (desktop mapping or web-enabled), including the following (to be distributed by the HAF GIO):
  - Buffering/stand-off tool
  - Cordon tool
  - Air emissions/contaminant dispersion tool (ALOHA model or similar)

USAF GeoBase CONOPS: GeoBase IOC Capability

- Orthoimagery of installation mission decision space
  - Default would be IKONOS 1-m imagery thru HAF GIO
  - BCE would maintain Ground Control Survey Registry
- Incorporation of existing CAD into local CIP
  - GPS georeferencing may be necessary
- Visualize ACES-RP data in local CIP
  - RP data links will posture AF to address OSD concerns
- Local staffing to attain/maintain/sustain GeoBase

USAF GeoBase CONOPS: Post-IOC Capability

- **Viewshed/line-of-sight tool**
- **Vehicle/asset routing tool**
- **Ability to query, visualize, and report data from other GeoBase-enabled systems via the CIP base map viewer tool.**
  - **The ability to *update* information in GeoBase-enabled systems directly from the map interface will be limited, but may be available based on mission needs.**

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USAF GeoBase CONOPS: IOC Requirements

Minimal requirements necessary for bases to meet IOC:

- **At a minimum, the CIP includes features defined in CONOPS**
- **The CIP will be stored in the Universal Transverse Mercator 1983 (UTM83) coordinate system, Transverse Mercator projection, Geodetic Reference System 1980 (GRS80) spheroid, World Geodetic System 1984 (WGS84) datum, and use metric coordinate units. Should other georeferencing parameters be required to support a specific mission requirement, a mechanism will be established to support necessary coordinate transformations and projections.**
- **A skilled cadre of full-time personnel in place at the base to develop, implement, and sustain the local GeoBase program. Staffing requirements will be established by the MAJCOM.**
- **Mission processes in place to assemble and coordinate maintenance of the CIP.**

USAF GeoBase CONOPS: IOC Requirements (cont'd)

- **CIP data shall be organized using the latest version of the CADD/GIS Center Spatial Data Standards (SDSFIE). Should other data content standards be required to support a specific mission requirement, a mechanism will be established to support necessary data conversions.**
- **CIP vector data shall be collected at 1:1200 (1"=100') scale for base cantonment areas and 1:4,800 (1"=400') scale for large undeveloped (natural) base areas, and will meet National Map Accuracy Standards at those scales.**
- **Metadata describing CIP features shall be collected and organized using an approved subset of the Federal Geographic Data Committee (FGDC) Content Standards for Digital Geospatial Metadata (CSDGM).**
- **IOC includes 1-meter orthorectified panchromatic imagery for the CIP.**

USAF GeoBase CONOPS: IOC Requirements (cont'd)

- **Survey ground control points shall be identified and maintained to support CIP imagery registration as well as defray the costs of all subsequent base mapping efforts.**
- **Garrison base CIPs shall be stored and served from the base Network Control Center (NCC).**
- **CIPs shall be served via protected means to all base functionals and the MAJCOMs.**
- **SIPRNet access to GeoReach and other classified GeoBase data shall be available within Civil Engineering Readiness, Security Forces, and the Command Post at each base.**

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USAF GeoBase CONOPS: MAJCOM IOC Requirements

The following requirements are necessary for MAJCOMs to meet IOC:

- **MAJCOM Geo Integration Office (GIO) established to manage the GeoBase program across their respective installations/AORs and to coordinate operations with the HAF GIO.**
- **Ability for MAJCOMs to access their installation CIPs across the NIPRNet using secure protocols.**
- **Strategic plans in place to guide GeoBase investment and execution across the MAJCOM.**

USAF GeoBase CONOPS: Expeditionary IOC Req'ts

- **A process is established to quickly declassify GeoReach CIP data for use by PRIME BEEF and similar sustainment organizations at expeditionary bases.**
- **The CIP is served to the command and control echelon at an expeditionary base in a secure fashion via Comm infrastructure at the base.**
- **RED HORSE, TALCE, and other similar units have established processes and UTCs to map newly constructed infrastructure to the FOL CIP as those assets are constructed.**
- **PRIME BEEF Lead and Follow Teams have established processes and UTCs to maintain and serve the FOL CIP via the communications infrastructure at the expeditionary base.**
- **An efficient mechanism is in place to update the CIP on the MAJCOM GeoReach server.**

USAF GeoBase CONOPS: GeoReach IOC Requirements

- **FOL CIP includes a minimum of 1-meter vertical panchromatic imagery**
- **CIPs for FOLs in a given AOR should be stored and served from central locations determined by the MAJCOMs.**
- **GeoReach CIPs will be served on the SIPRNet.**
- **A minimal set of GeoReach applications will be available to support bare base beddown planning and MOG estimations. These applications are not required to be web-enabled, however, they must possess the capability to exploit FOL CIPs served via GeoReach web portals on the SIPRNet.**

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USAF GeoBase CONOPS: Post-IOC Requirements

- **Use the Air Force Portal, classified and unclassified, to access GeoBase CIPs and GeoBase applications.**
- **Enhance the IOC CIP with all necessary additional data as required to support mission needs.**
- **Continue spiral development of GeoBase architecture to include other GeoBase requirements.**
- **Panchromatic and multi-spectral imagery is acquired for all Air Force ranges.**
- **Establish full interoperability with the GCSS Integration Framework.**
- **Complete spiral development of GeoBase architecture to encompass the full spectrum of basing operations.**

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Introductory Brief

- HAF GIO overview
- Recent HAF GIO activities
- GeoBase conceptual overview
- USAF GeoBase Strategic Plan
  - Review of relevant items
- USAF GeoBase CONOPS
  - Review of relevant items
- Summary

Challenges for the GeoBase

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- **Securing Air Staff confidence in GeoBase/HAF GIO**
  - **Establishing a GeoBase SPO**
  - **ILE serves as near-term GeoBase sponsor**
- **Securing MAJCOM confidence in GeoBase/HAF GIO**
  - **Confronting ‘bells and whistle’ legacy of GIS in CE**
  - **HAF GIO seeking ‘standards-based’ innovation**
- **Securing Wing confidence in GeoBase/MAJCOM GIO**
  - **Most to gain from installation situational awareness**
  - **End users are the ultimate centers of gravity to success**

Questions?

Let's go to work…

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